

What is claimed is:

1. A film acoustic wave device comprising: a wafer made of a semiconductor substrate; a ground electrode formed on top of the semiconductor substrate; a piezoelectric thin film formed on top of the ground electrode; and an upper electrode formed on top of the piezoelectric thin film, wherein a pattern shape for the film acoustic wave device is changed by a position at the wafer.
2. The film acoustic wave device according to claim 1, wherein a length of the upper electrode is changed by the position at the wafer.
3. The film acoustic wave device according to claim 1, wherein a width of the upper electrode is changed by the position at the wafer.
4. The film acoustic wave device according to claim 1, wherein the upper electrode includes a plurality of upper electrodes, wherein distances between the upper electrodes are changed by the position at the wafer.
5. The film acoustic wave device according to claim 1 further comprising a bonding pad for connecting with the

upper electrode, wherein a shape of the bonding pad is changed by the position at the wafer.

5 6. The film acoustic wave device according to claim 5 further comprising a connecting pattern for connecting the upper electrode with the bonding pad, wherein a shape of the connecting pattern is changed by the position at the wafer.

10 7. The film acoustic wave device according to claim 6, wherein the connecting pattern forms an air bridge.

15 8. The film acoustic wave device according to claim 1 further comprising a capacitor provided on the same semiconductor substrate as the film acoustic wave device, wherein a capacitance of the capacitor is changed by the position of the wafer.

20 9. The film acoustic wave device according to claim 1, wherein the semiconductor substrate is made of gallium arsenide (GaAs); the piezoelectric thin film is made of lead titanate ( $\text{PbTiO}_3$ ); and at least one of the upper electrode is a conductor substantially made of platinum (Pt).

25 10. The film acoustic wave device according to claim 1, wherein the a semiconductor substrate is made of silicon

(Si); the piezoelectric thin film is made of lead titanate ( $\text{PbTiO}_3$ ); and at least one of the upper electrode is a conductor substantially made of platinum (Pt).

5 11. The film acoustic wave device according to claim 1, wherein the piezoelectric thin film is made of  $\text{PZT}(\text{PbTiO}_3\text{-PbZrO}_3)$ ; and at least one of the upper electrode and the ground electrode is a conductor substantially made of platinum (Pt).

10 12. The film acoustic wave device according to claim 1, wherein the piezoelectric thin film is made of zinc oxide ( $\text{ZnO}$ ).

15 13. The film acoustic wave device according to claim 1, wherein the piezoelectric thin film is made of aluminum nitride ( $\text{AlN}$ ).

20 14. The film acoustic wave device according to claim 1 further comprising an inductor between the semiconductor substrate and the ground electrode.

25 15. A circuit device comprising: a substrate; and a plurality of elements formed on the substrate, wherein the pattern shape of the elements formed on the substrate is

changed by a position at the substrate.

~~16.~~ A manufacturing method of the film acoustic wave device comprising steps of:

- 5 (a) forming a ground electrode on top of a wafer made of a semiconductor substrate;
- (b) forming a piezoelectric thin film on top of the ground electrode;
- 10 (c) forming an upper electrode on top of the piezoelectric thin film; and
- (d) changing a pattern shape of the upper electrode formed on top of the piezoelectric thin film by the position at the wafer.

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*B<sup>1</sup>* 17. The manufacturing method of the film acoustic wave device according to claim 16, wherein the step of changing the pattern shape includes a step of changing the length of the upper electrode by the position at the wafer.

20 18. The manufacturing method of the film acoustic wave device according to claim 16, wherein the step of changing the pattern shape includes a step of changing the width of the upper electrode by the position at the wafer.

25 ~~19.~~ The manufacturing method of the film acoustic wave

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device according to claim 16, wherein the step of forming the upper electrode forms a plurality of upper electrodes, and wherein the step of changing the pattern shape includes a step of changing the distance between the upper electrodes by the position at the wafer.

20. The manufacturing method of film acoustic wave device according to claim 16, and wherein the step of forming the upper electrode further includes a step of connecting of the upper electrode to a bonding pad, and wherein the step of changing the pattern shape includes a step of changing a shape of the bonding pad by the position at the wafer.

21. The manufacturing method of the film acoustic wave device according to claim 20, wherein the step of forming the upper electrode further includes the connecting the upper electrode and the bonding pad to a connecting pattern, and wherein the step of changing the pattern shape includes a step of changing a shape of the connecting pattern by the position at the wafer.

22. The manufacturing method of the film acoustic wave device according to claim 21, wherein the step of changing the pattern shape includes a step of forming the connecting pattern with the air bridge.

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23. The manufacturing method of the film acoustic wave device according to claim 16 further comprising a step for setting a capacitor on the same semiconductor substrate as
- 5 the film acoustic wave device, and wherein the step of changing the pattern shape includes a step of changing a capacitance of the capacitor by the position at the wafer.

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